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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER
LAROSE, COLIN M

ART UNIT	PAPER NUMBER
2623	

DATE MAILED: 10/21/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

	Application No.	Applicant(s)
Office Action Summary	09/842,048	TSAI ET AL.
	Examiner	Art Unit
	Colin M. LaRose	2623

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on *17 June 2004*.

2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) *1-26,28,29,31,32,34 and 35* is/are pending in the application.

    4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) *1-26,28,29,31,32,34 and 35* is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

    a) ☐ All b) ☐ Some * c) ☐ None of:

      1. ☐ Certified copies of the priority documents have been received.

      2. ☐ Certified copies of the priority documents have been received in Application No. _____.

      3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Response to Amendments and Arguments

1.   Applicant has amended (Amt. filed 06-2004) claims 1, 8, 15, 23, 24, 25, and 26, to denote that the surface fitting is determined "using a linear model." Arguments regarding this feature are moot in view of the new grounds of rejection presented below.

2.   Applicant argues (Remarks filed 06-2004, p. 16) that Poggio does not disclose "determining ... based on the face region for the image," however, Poggio's entire disclosure is directed to processing a face image (see Poggio, figure 1), so it is not clear how Poggio does not determine ... based on the face image.

3.   Applicant argues (Remarks filed 09-2004, p. 19) that Poggio "uses all the pixels in the window, instead of 'only the pixels determined to be part of the face region.'" However, as was pointed out in the previous Office action, Poggio discloses masking the window so that background pixels are eliminated and only the face region is processed (see Poggio, column 9, lines 41-48). Furthermore, Zettel discloses removing the background and processing only the relevant foreground pixels (see Zittle, figure 5: background removal block 41).

Claim Objections

4.   The previous objection to claim 3 has been withdrawn in view of Applicant's amendment.

Claim Rejections - 35 USC § 103

5.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

6.   This application currently names joint inventors. In considering patentability of the

claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various

claims was commonly owned at the time any inventions covered therein were made absent any

evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out

the inventor and invention dates of each claim that was not commonly owned at the time a later

invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c)

and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

7.   Claims 1, 4, 8, 11, 15, 18, and 22 are rejected under 35 U.S.C. 103(a) as being

unpatentable over U.S. Patent 5,642,431 by Poggio et al. ("Poggio") in view of U.S. Patent

6,445,812 by Lai et al. ("Lai").

Regarding claim 1, Poggio discloses a method for illuminant compensation of an image

including a face region comprising:

determining a surface fitting based on the face region for the image (column 9, lines 34-

54 and 404, figure 4: best-fit brightness plane is determined or otherwise obtained);

generating an illuminant corrected image using the surface fitting face region for the image (column 9, lines 34-54: surface fitting is subtracted from the face image to produce illuminant corrected image); and

normalizing the image (column 9, lines 34-54 and 405, figure 4: image is normalized via histogram equalization).

Poggio is silent to "determining ... using a linear model," as claimed.

Lai discloses a system for illuminant compensation on an image that comprises the application of a surface fitting (16, figure 1), similar to the illuminant compensation process employed by Poggio. Lai discloses that the surface fitting provides an estimate of the image's logarithmic irradiance function (column 2, lines 58-62) and is formulated using a linear (polynomial) model (column 3, lines 5-15; column 4, lines 29-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Poggio by Lai to determine the surface fitting using a linear model, since Lai discloses that using a linear model to determine a surface fitting for effecting illumination compensation of an image was a conventional practice.

Regarding claims 8, 15, and 22, Poggio expressly discloses all of the features of these claims that correspond to the features recited in claim 1, and modifying Poggio by Lai to achieve the claimed invention would have obvious for the reasons stated above.

Regarding claims 4, 11, and 18, Poggio teaches subtracting the surface fitting from the image as claimed (column 9, lines 48-50).

8.   Claims 2, 3, 9, 10, 16, 17, and 23-26 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Poggio in view of Lai, and further in view of U.S. Patent 6,148,092 by Qian.

Regarding claims 2, 9, 16, and 23-26 Poggio discloses that the image includes pixels, and

the step of determining the surface fitting includes:

obtaining a window (19x19) of pixels that includes a face; and

masking out portions of the window that do not belong to the face so that the surface

fitting is performed only on the face region (column 9, lines 36-44).

Poggio's rationale for masking out the background areas is that the background areas are

not relevant to the face detection task.

Thus, Poggio teaches, "determining a surface fitting for the image, the surface fitting is

determined using only the pixels that were determined to be part of the face region."

However, Poggio is silent to extracting the face from other regions, such as the

background, by "determining for each pixel whether the pixel's color is within a predetermined

set of colors; and determining the pixel to be part of the face region if it is determined that the

pixel's color is within the predetermined set of colors."

Qian discloses a method for extracting a face region that comprises detecting skin tones

and segmenting a face from background regions based on the detected skin tones. In particular,

Qian teaches detecting a face in an image comprised of a plurality of colors pixels by:

determining for each pixel whether the pixel's color is within a predetermined set of

colors (i.e. whether each pixel is within the circle in figure 3); and

determining the pixel to be part of the face region if it is determined that the pixel's color

is within the predetermined set of colors (i.e. the pixels that are within the circle are assigned a

"1" and all other pixels are assigned "0", as shown in figure 5). See also column 4, lines 41-60.

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Poggio by Qian to determine for each pixel whether the pixel's color is within a

predetermined set of colors and determining the pixel to be part of the face region if it is

determined that the pixel's color is within the predetermined set of colors by extracting the face

region according to skin tone, since Qian teaches that detecting face regions in this manner is

advantageous because, *inter alia*, it is insensitive to changes in lighting conditions (column 2,

lines 30-35).

Further regarding claims 23-26, Poggio is also silent to "determining ... using a linear

model," as claimed.

Lai discloses a system for illuminant compensation on an image that comprises the

application of a surface fitting (16, figure 1), similar to the illuminant compensation process

employed by Poggio. Lai discloses that the surface fitting provides an estimate of the image's

logarithmic irradiance function (column 2, lines 58-62) and is formulated using a linear

(polynomial) model (column 3, lines 5-15; column 4, lines 29-45).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Poggio by Lai to determine the surface fitting using a linear model, since Lai discloses

that using a linear model to determine a surface fitting for effecting illumination compensation of

an image was a conventional practice.

Regarding claims 3, 10, and 17, Qian teaches determining if the pixel's color is a skin color (see abstract).

9.   Claims 5, 6, 12, 13, 19, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Poggio in view of Lai, and further in view of U.S. Patent 4,975,970 by Zettel et al. ("Zettel").

Regarding claims 5, 12, 19, Poggio teaches normalizing the image by histogram equalization methods, but is silent to the particular claimed features for normalization.

Zettel discloses a process (figure 4) for histogram equalization of an image, wherein an image is automatically normalized according to a user's preferences. In particular, Zettel discloses

computing the average gray level and standard deviation for a plurality of pixels in the image (31, figure 4), and

transforming the level of each pixel based on a scale factor derived from the mean and standard deviation (35, figure 4), wherein the gray levels are within a predetermined range (figure 3: V_{min} ... V_{max} is the predetermined range of possible pixel values).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify Poggio by Zettel to achieve the claimed invention since Poggio discloses normalization of the face image via histogram equalization, and Zettel teaches that performing histogram equalization as claimed allows a user to specify a preference for image brightness and contrast in order to produce a visually preferred image (column 3, lines 54-60).

Regarding claims 6, 13, and 20, Poggio discloses masking out background pixels and

retaining only the pixel corresponding to the face, thereby determining whether each pixel is part

of the face region (column 9, lines 35-44). This causes Zettel's histogram equalization process

(including the mean and standard deviation computations) to be performed on only pixels that

comprise the face region.

10.   Claims 28, 31, and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Poggio in view of U.S. Patent 4,975,970 by Zettel et al. ("Zettel").

Regarding claims 28, 31, and 34, Poggio teaches normalizing the image by histogram

equalization methods, but is silent to the particular claimed features for normalization.

Zettel discloses a process (figure 4) for histogram equalization of an image, wherein an

image is automatically normalized according to a user's preferences. In particular, Zettel

discloses

computing the average gray level and standard deviation for a plurality of pixels in the

image (31, figure 4), and

transforming the level of each pixel based on a scale factor derived from the mean and

standard deviation (35, figure 4), wherein the gray levels are within a predetermined range

(figure 3: V_{min} ... V_{max} is the predetermined range of possible pixel values).

It would have been obvious to one of ordinary skill in the art at the time of the invention

to modify Poggio by Zettel to achieve the claimed invention since Poggio discloses

normalization of the face image via histogram equalization, and Zettel teaches that performing

histogram equalization as claimed allows a user to specify a preference for image brightness and

contrast in order to produce a visually preferred image (column 3, lines 54-60).

Further regarding claims 28, 31, and 34, Poggio discloses masking out background pixels

and retaining only the pixel corresponding to the face, thereby determining whether each pixel is

part of the face region (column 9, lines 35-44). This causes Zettel's histogram equalization

process (including the mean and standard deviation computations) to be performed on only

pixels that comprise the face region.

11.   Claims 7, 14, and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Poggio in view of Lai and Zettel, and further in view of Qian.

Regarding claims 7, 14, and 21, Poggio does not disclose determining pixels to be part of

the face region based on the pixel being within a predetermined set of colors. However, this

limitation would have been obvious in view of Qian, as established above for claims 2, 9, and 16.

12.   Claims 29, 32, and 35 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Poggio in view of Zettel, and further in view of Qian.

Regarding claims 29, 32, and 35, Poggio does not disclose determining pixels to be part

of the face region based on the pixel being within a predetermined set of colors. However, this

limitation would have been obvious in view of Qian, as established above for claims 2, 9, and 16.

Conclusion

13.   Applicant's amendment necessitated the new ground(s) of rejection presented in this

Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a).

Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within TWO

MONTHS of the mailing date of this final action and the advisory action is not mailed until after

the end of the THREE-MONTH shortened statutory period, then the shortened statutory period

will expire on the date the advisory action is mailed, and any extension fee pursuant to 37

CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event,

however, will the statutory period for reply expire later than SIX MONTHS from the date of this

final action.

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to Colin M. LaRose whose telephone number is (703) 306-3489.

The examiner can normally be reached Monday through Thursday from 8:00 to 5:30. The

examiner can also be reached on alternate Fridays.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Amelia Au, can be reached on (703) 308-6604. The fax phone number for the

organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the TC 2600 Customer Service Office whose telephone number is (703) 306-0377.

CML

Group Art Unit 2623

13 October 2004

VIKKRAM BALI
PRIMARY EXAMINER